

General Presidential Address
REFRIGERATION: TECHNOLOGY FOR SURVIVAL

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Food now travels half way around the world before reaching the consumer, e.g. the United States started importing kiwifruit from New Zealand in 1962. And much farther than John Starr would have imagined, almost 100 years ago, when he presented the presidential address at the first annual meeting of the American Society of Refrigerating Engineers (ASRE).

“Refrigeration,” Starr observed, “is widening beyond bounds that were only dreamed of two decades ago.” In 1904, the food industry was already dependant on refrigeration, and there were other industries that had also found the value of controlled temperature and humidity; the production of oil, textiles, photography, chemicals, mining and health care. Later, in 1959 the American Society of Refrigerating Engineers (ASRE) joined with the American Society of Heating and Air Conditioning Engineers (ASHAE) to form ASHRAE.

Refrigeration is now commonplace, not only in industry, but in virtually every home in industrialized countries. Refrigeration continues to be used in other industries and enables science, technology, and medicine to perform the everyday miracles that we have become accustomed to: vaccines provided worldwide; life giving blood, tissue and organ transplants; computer and chip technology. ***Refrigeration is the technology of survival and advancement.***

What the refrigeration industry calls “*the cold chain*” encompasses the steps used to preserve food and other perishable products from the production stage to the consumption stage; ASHRAE is intimately related to the cold chain: ASHRAE

sponsors research, develops programs, teaches courses and develops technical information in handbooks to support and enhance the cold chain.

ASHRAE's background in refrigeration began 100 years ago when the newly formed ASRE sought to make sense out of, and standardize, the confused and chaotic existing refrigeration data. ASRE went to work setting standards for ammonia fittings and established measuring instructions. In 1912 ASRE convinced the U.S. Congress to appropriate money to enable the Bureau of Standards to review the data on physical constants used in refrigeration. When the appropriation wasn't renewed, ASRE raised the money for the Bureau's research staff to continue, creating one reliable universal ammonia table, determining the standard tonnage basis of refrigeration and developing one of the first Refrigeration Safety Codes,

Many feel that less emphasis has been placed on refrigeration in recent years **Let us take this year, the 100th anniversary of ASRE, to remind our industry and the public about the importance of refrigeration and the need to make even greater strides in improving the cold chain's effectiveness to improve the quality of life for people throughout the world.**

As the world's population increases, the dynamics of food supply and storage versus population will be crucial. With the population currently increasing at a rate of 77 million people per year, mostly in areas where food deficits already exist, the burden is on us to be the technological link in the cold chain. We need to advance refrigeration technology to enable all the people of the world to enjoy the benefits of refrigeration. Because, according to the World Health Report of 2002, the number one cause of death for people around the world is undernourishment.

This mission will continue to increase in importance. Not only does the

population continue to grow, but the average life span continues to increase. Meanwhile, agriculturists fear that food production cannot keep pace with population growth. The world's crops have reached a "yield plateau" that cannot be overcome without jeopardizing farmlands. Most of the earth's high quality agricultural land is already in use, and the cost of converting the remaining marginal areas is too high both in financial and ecological costs to be feasible.

Planet Earth has a long future ahead - we can and we must contribute to this future.

Accepting that challenge must begin at our very foundation — with our technical societies and teaching communities. They can develop programs; initiate text revisions, fund research projects, or monitor standards that impact the Cold Chain and energy utilization. We cannot underestimate the value of each individual member's contribution, because knowledge is cumulative

There are countries where, right now, up to 50% of the crops fail to make it to the first phase of the after-harvest food chain. We must help to find ways to construct energy efficient, low cost refrigerated transport and storage facilities in countries ravaged by hunger. And, we must remember that refrigeration has other uses besides food -- refrigeration is a vital part of the infrastructure necessary to deliver vaccines worldwide especially to areas like Sub-Saharan Africa where the need is great.

Thousands of lives around the world have been saved by vaccines for diseases such as polio, measles, chickenpox and hepatitis. Yet, as many as 2 million children die every year from diseases that are preventable with available vaccines. That's as if 20 jumbo jets filled with children crashed, with no survivors, **every day of the year.**

We must not lose sight of the environmental impact of current and future

refrigerated facilities. The problems of global warming and ozone depletion must be further addressed, by continuing to phase out refrigerants that destroy both the earth's ozone layer and contribute to global warming. But, even ozone friendly refrigerants affect global warming, because the global warming potential of refrigerants is minuscule when compared to the CO₂ given off during the production of energy used to power refrigerated facilities. So, increasing the energy efficiency of refrigeration systems is the most effective way to battle global warming.

The waste heat given off by power production, HVAC&R applications and industrial processes often dissipates as waste heat into the atmosphere. This wasted heat can be used for absorption cooling, co-generation or even tri-generation (the simultaneous production of electrical power, heating and refrigeration). Heat pumps reduce CO₂ emissions and can be used to both heat and cool. We need to encourage governmental bodies to provide incentives for the use and reuse of waste heat.

Unfortunately, energy efficient equipment usually means a higher first cost, so there must be an incentive, or mandate, to convince manufacturers and consumers that the efficient equipment is indeed advantageous. An example of such a mandate is the recent rule by the United States government that residential central air conditioner units must be 30% more energy-efficient by January 2006. Also, government and industrial organizations have recently raised federal minimum efficiency standards for commercial refrigerators and freezers; which will save over 2.3 billion KWH/year.

We must look outward, into other communities, to promote the

understanding and implementation of new technologies which promote energy efficiency, comfort and environmental preservation. The humanitarian benefits of refrigeration can also be used as a means to encourage young people to join our industry.

We can participate in worldwide programs to update HVAC&R technology, such as working with engineers in developing or war-torn countries. We should encourage institutions to construct more hands-on technical facilities for the training of technicians and operators of refrigeration systems. We can target research programs that benefit people living in countries with limited funds and technology. We can actively participate in meetings, at all levels, to share our technology.

Looking ahead, Planet Earth has a long future. We can and must contribute to the vitality of this future. Refrigeration needs to be revitalized to better serve the needs of the world. We need to seek the best in refrigerants, efficiency, cost reduction, reliability and energy utilization for all types of refrigeration: industrial, transport and domestic. Heating and air conditioning will also have to be enhanced to make inhospitable land inhabitable.

Let us ensure that the cold chain is strengthened and increased to reach all the corners of the world. And, that each one of us, will continue to strive for greater energy utilization, efficiency and conservation in all HVAC&R endeavors **to improve the quality of life throughout the world.**